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(54) METHOD AND APPARATUS FOR CONTROLLING UNSOLICITED MESSAGING

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H04L 12/66 (2006.01)
H04M 15/06 (2006.01)

(52) **U.S. Cl.** **370/352**; 235/375; 379/88.19; 379/88.22; 379/142.05; 455/456.4; 702/176; 709/202; 709/206; 709/207; 709/209; 709/229; 713/168

(58) **Field of Classification Search** 370/352; 379/142.05, 88.19, 88.22; 709/206, 207, 709/202, 203, 209, 229; 235/375; 455/456.4; 702/176; 713/168
See application file for complete search history.

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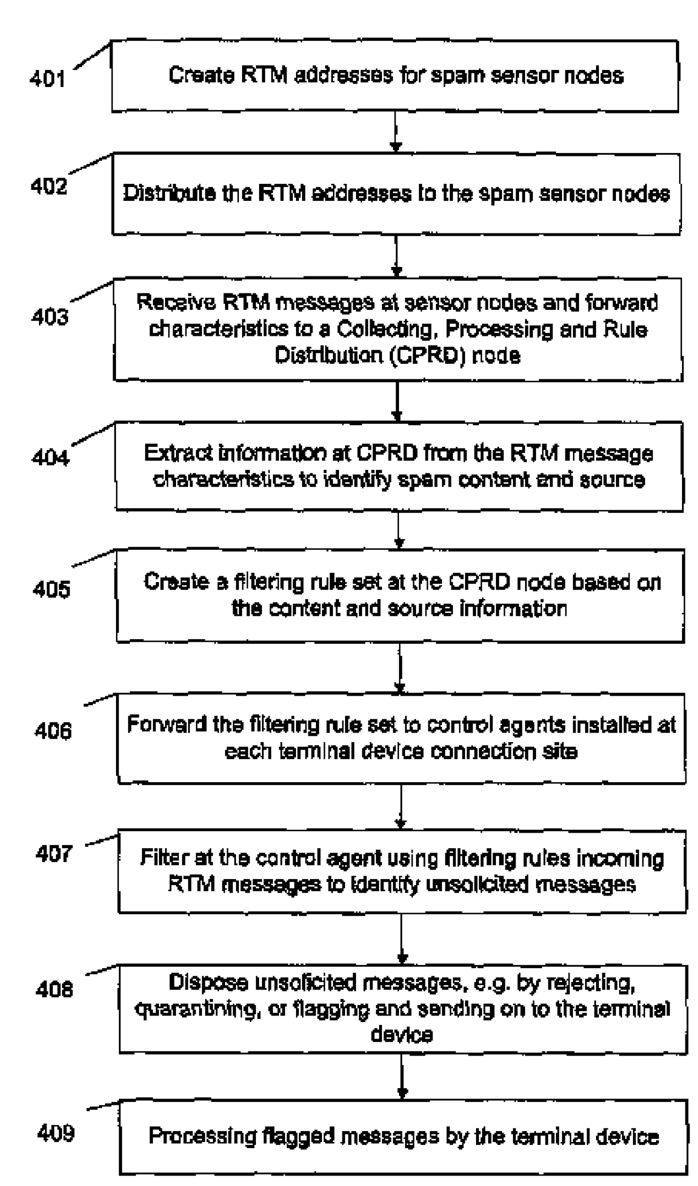
(57) ABSTRACT

Sensor nodes (or addresses therefore), acting as real-time message decoys, are distributed across a real-time communications network to attract unsolicited real-time messages. Filtering rules are derived from the message characteristics (such as the source address) and messaging content of the traffic encountered at the sensor nodes. The filtering rules are distributed to filtering agents positioned in the communications network in such a way that they can filter traffic for legitimate users. The filtering agents may identify and control the disposition of real-time messaging traffic that is part of a mass communication campaign on behalf of legitimate users of the real-time messaging communication system. Disposition may include suppressing, diverting, or labeling.

8 Claims, 4 Drawing Sheets



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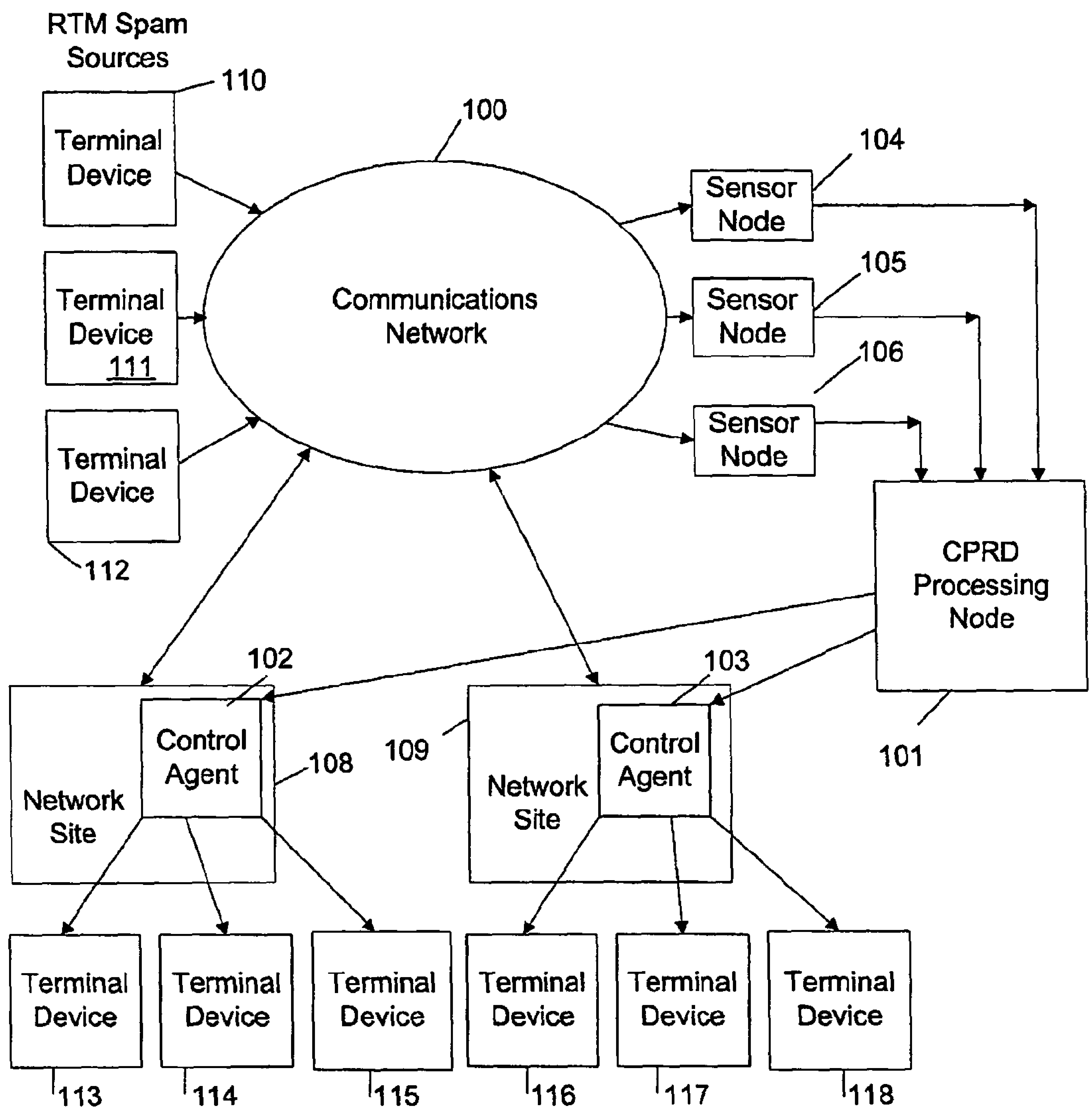
RTM Spam
Sources
110
Terminal
Device
100
104
Sensor
Node
Terminal
Device
111
Communications
Network
105
Sensor
Node
106
Sensor
Node
Terminal
Device
112
CPRD
Processing
Node
102
103
Control
Agent
108
109
Control
Agent
101
Network
Site
Network
Site
Terminal
Device
113
Terminal
Device
114
Terminal
Device
115
Terminal
Device
116
Terminal
Device
117
Terminal
Device
118

FIG.1

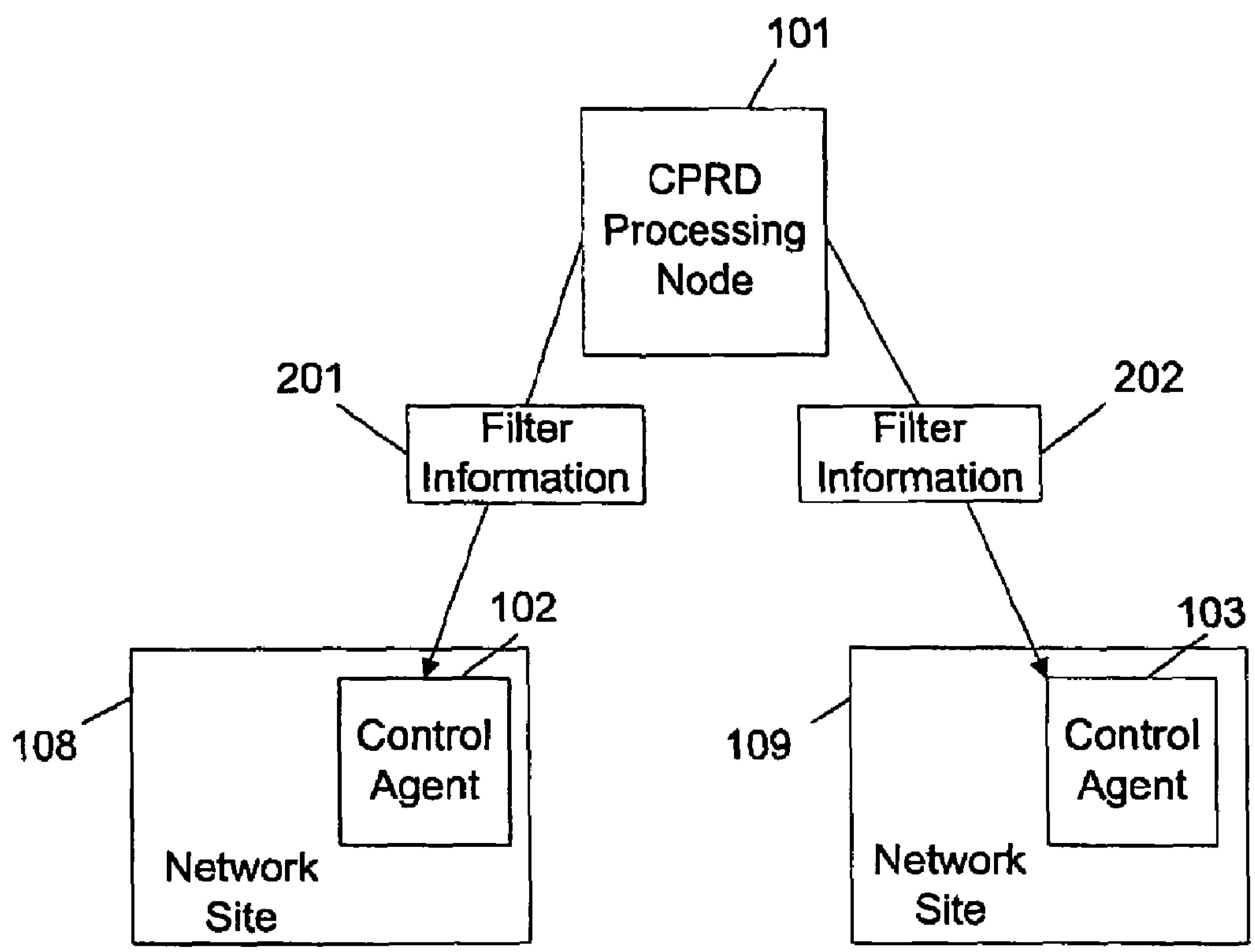
101
CPRD Processing Node
201
Filter Information
202
Filter Information
102
103
108
Control Agent
Network Site
109
Control Agent
Network Site

FIG.2

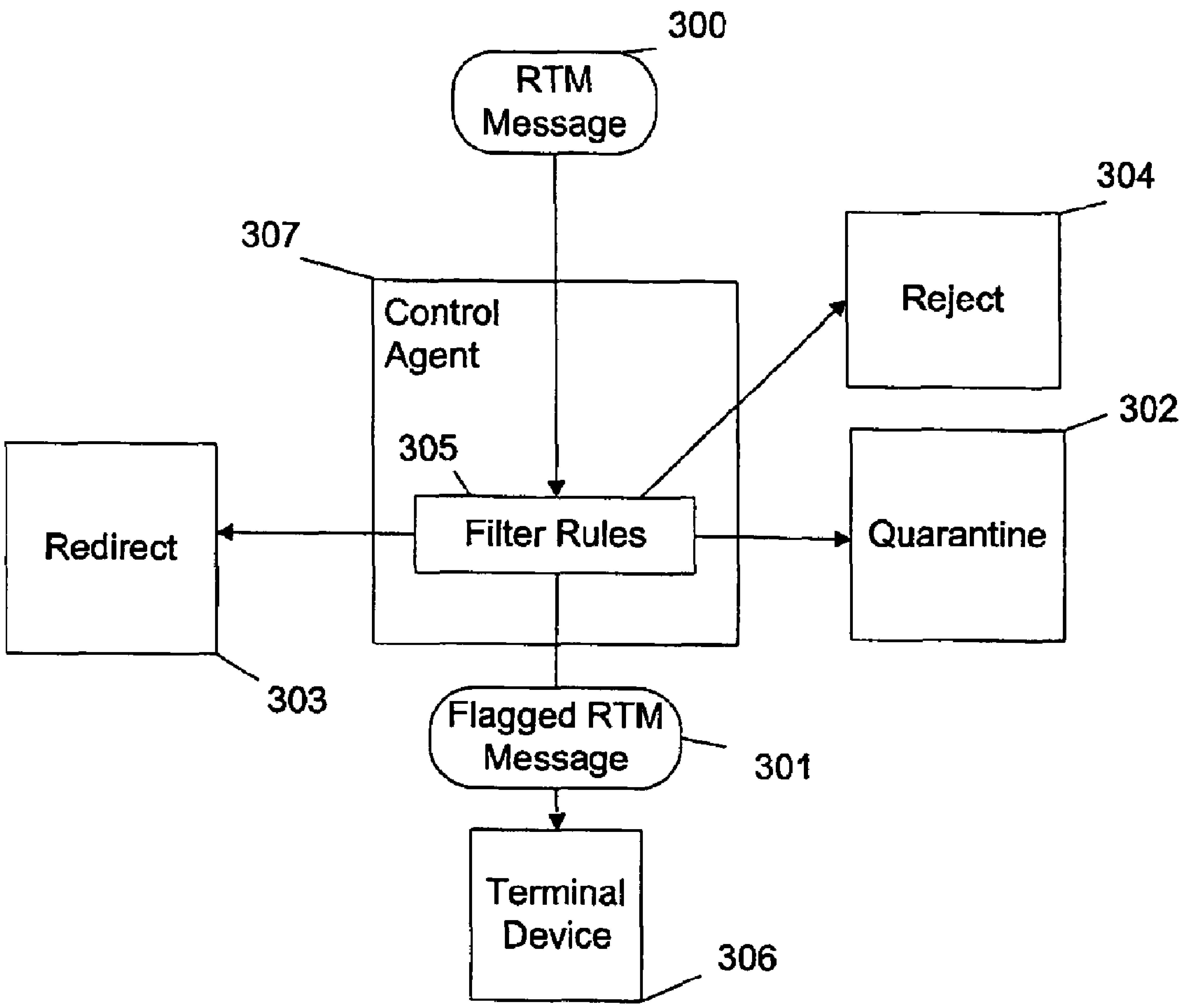
300
RTM Message
304
307
Control Agent
Reject
302
305
Redirect
Filter Rules
Quarantine
303
Flagged RTM Message
301
Terminal Device
306

FIG.3

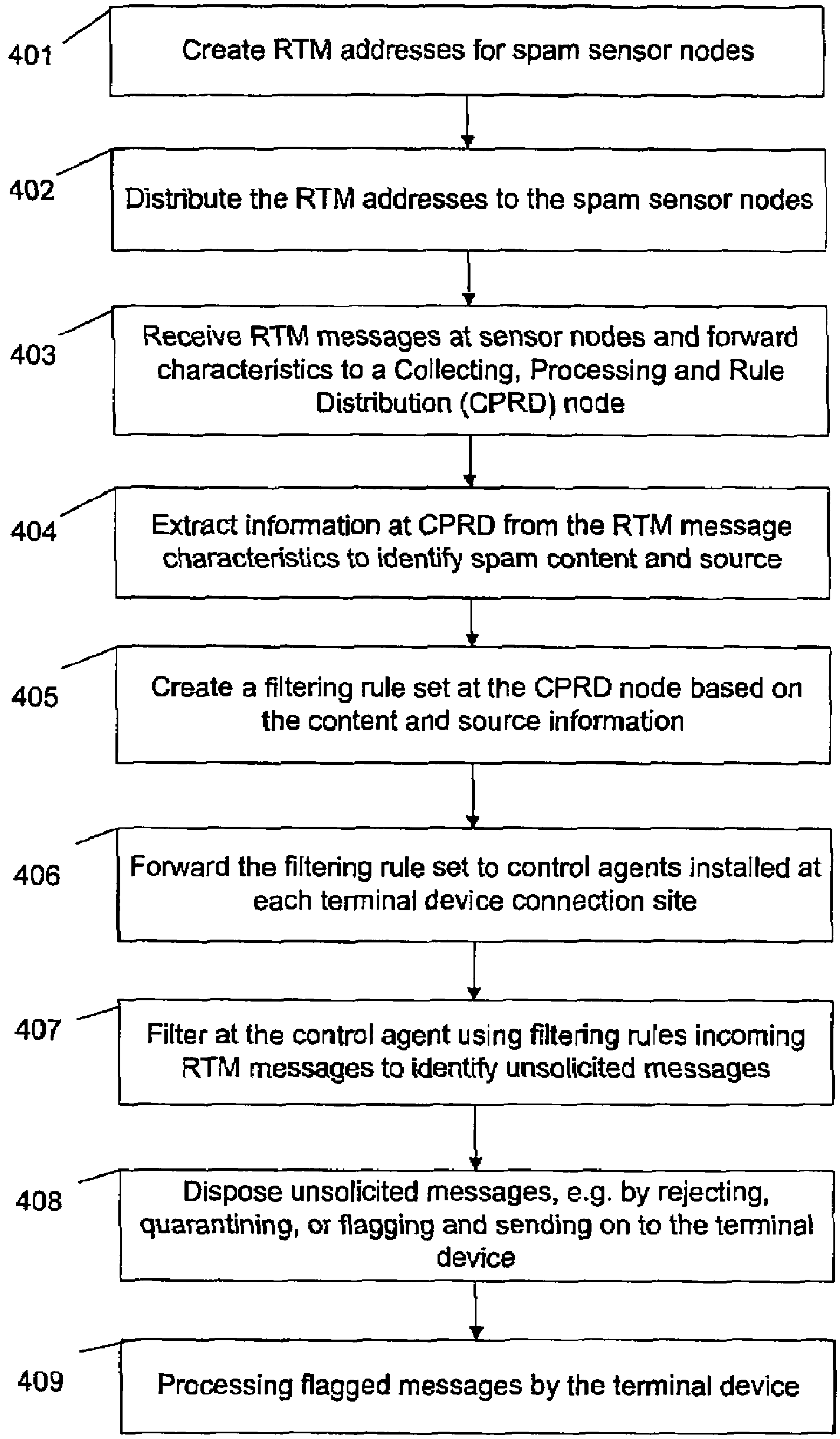
401
Create RTM addresses for spam sensor nodes
402
Distribute the RTM addresses to the spam sensor nodes
403
Receive RTM messages at sensor nodes and forward characteristics to a Collecting, Processing and Rule Distribution (CPRD) node
404
Extract information at CPRD from the RTM message characteristics to identify spam content and source
405
Create a filtering rule set at the CPRD node based on the content and source information
406
Forward the filtering rule set to control agents installed at each terminal device connection site
407
Filter at the control agent using filtering rules incoming RTM messages to identify unsolicited messages
408
Dispose unsolicited messages, e.g. by rejecting, quarantining, or flagging and sending on to the terminal device
409
Processing flagged messages by the terminal device

FIG.4

METHOD AND APPARATUS FOR CONTROLLING UNSOLICITED MESSAGING

This application claims the benefit of U.S. Provisional Application No. 60/531,983, filed on Dec. 24, 2003, entitled "Method and Apparatus for Controlling Unsolicited Messaging in Real Time Messaging Networks," which application is hereby incorporated herein by reference.

TECHNICAL FIELD

The present invention relates to a method and system for controlling the delivery of unsolicited real-time data, voice and video messages over a communications network such as the Internet.

BACKGROUND

There are two quite different types of electronic networks that are evolving: a standard telephone network and a data network (e.g., the Internet). The standard telephone network, such as a wireless telephony network and the POTS network, is designed to carry real-time messaging content. Capacity is allocated in real-time bandwidth and, once you have a connection of adequate bandwidth established between two points, data that is delayed is viewed as a network fault. Examples of communications that may be carried via a standard telephone network(s) include voice communications, multi-party conference calls, video conference calls, or the like.

Another characteristic of standard telephone networks is that each network is typically owned and controlled by a small number (typically a single company in the case of wireless networks) of large companies that historically have provided service directly to end users of the network and therefore have a billing type relationship with them. Where a connection is made through the facilities of another provider, there is typically a commercial contract in place between the two companies. These standard telephone networks, in part because of the relatively close relationship between the service vendors and network users, have the characteristic that the originator of a call can be readily identified, allowing "caller ID" service to be readily implemented and to be widely known and in fact expected.

In contrast, the second type of network (e.g., data networks such as the Internet, LANs, WANs, VPNs, and the like) were designed to move mostly one-way, non-real time data from point to point. In this type of network, the delay of data has typically not been regarded as a network fault. Additionally, some data networks, particularly the Internet, are far more disjoint than a standard telephone network. There are many more companies involved, and there is much less control of individual point-to-point end-user connections. It is typical that a company that provides transmission of data on the Internet has a tenuous commercial relationship with the originators of most of the data packets that it is carrying. In fact, Internet service providers (ISPs) protect the privacy and anonymity of their subscribers.

This tenuous commercial relationship with end users coupled with the relative ease with which the end-user computers that originate much of the traffic on the Internet can be anonymously enlisted in the service of third parties, leads to the fact that a "caller ID" type service is nearly impossible to implement on the Internet.

In recent years, these data networks have begun to evolve to provide real-time, two-way communications between parties. The communications may include, for example, voice-over-IP (VOIP), instant messaging, interactive video conferencing (e.g., web meetings), or the like.

Using the electronic data networks for real-time, two-way communications provide several advantages. In particular, using these electronic networks for real-time, two-way communications is relatively low cost and easily accessible. The proliferation of networks throughout today's society, particularly the Internet, has ensured ready access to a communications device capable of communicating with any other individual communicatively coupled to the same network. Essentially anyone with a computer, a personal data assistant, a wireless telephone, or the like can connect to the Internet and communicate with someone at a remote location within seconds. Likewise, companies can use internal networks (e.g., WANs, VPNs, or the like) to allow geographically dispersed employees to communicate in real-time using many of the same technologies. Notably, the communications can frequently occur with equipment already purchased as networks and access devices are generally already in place to handle data needs.

As this type of communications becomes more widespread, it will inevitably become a target for advertisers and telemarketers as a method to distribute advertising messages in vast quantities. Because of the low cost of distributing massive amounts of advertising, advertisers can economically transmit advertising communications with response rates that are orders of magnitude less than would be necessary to support more traditional means of advertising. Additionally, as discussed above, anonymity given the sender prevents "do not call" lists and caller-ID type mechanisms from providing an adequate solution.

Electronic mail (e-mail) has already seen this problem. E-mail is a store-and-forward communications method in which one-way communications (as opposed to a two-way communications) are sent from one network node to another network node until the final destination is reached, where a recipient may or may not retrieve a message or respond. Because e-mail is inexpensive and advertisers can transmit massive amounts of e-mail quickly (and often automatically), e-mail advertisements (e.g., junk e-mail) are becoming a burden to networks and users alike. This use of e-mail to send massive amounts of advertisements is known as the e-mail "spam" problem.

Attempts have been made to reduce the effect of e-mail spam on the end users. One such attempt is described in U.S. Pat. No. 6,052,709, wherein a system that attempts to filter incoming e-mail to identify junk e-mail is described. This system, however, only applies to e-mail, which, as described above, is a one-way communication, and does not apply to two-way, real-time communications, such as voice, video, real-time text, or the like.

Therefore, there is a need for a method and system to identify and filter unsolicited real-time, two-way communications.

SUMMARY OF THE INVENTION

These and other problems are generally solved or circumvented, and technical advantages are generally achieved, by preferred embodiments of the present invention which provides a system and method for controlling the delivery of unsolicited real-time messages over an electronic communications network.

In accordance with an aspect of the invention, there is provided a method for detecting, identifying and filtering unsolicited real-time messaging (RTM) messages. Generally, the method may comprise the following steps.

a.) Creating a sensor/decoy destination address, each destination address being capable of receiving RTM messages, but no destination address is intended to receive RTM messages destined for an actual user. Because there is no actual user associated with the destination address, all RTM messages involving that destination address are unsolicited.

b.) Monitoring the RTM messages received at the destination addresses. Each RTM message received at the destination address is analyzed for information such as content and originating address information that could be useful in identifying that particular message or other traffic from that source if it were to arrive at an RTM terminal device.

c.) Collecting and processing information related to the RTM messages received at the destination address and downloading processed information into control agents situated at network nodes through which RTM traffic flows to reach protected terminal devices. The downloaded information is used to filter incoming RTM messages.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be readily understood, embodiments of the invention are illustrated by way of examples in the accompanying drawings, in which:

FIG. **1** is a block diagram of the architecture for controlling the delivery of unsolicited RTM communications according to an embodiment of the present invention;

FIG. **2** is a block diagram showing a portion of FIG. **1** in detail, illustrating the communication of filter rules from a processing center to site control agents;

FIG. **3** is a block diagram showing a portion of FIG. **2** in detail illustrating how a site control agent alters the destination or content of an unsolicited RTM message using filtering rules; and

FIG. **4** is a process flow chart for a method of identifying and controlling delivery of unsolicited RTM messages in accordance with an embodiment of the invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

This section describes the instant invention with reference to the accompanying figures. The description uses a number of terms that are defined more precisely in the following paragraphs.

The following description discloses a system and method for controlling unsolicited real-time, two-way communications, referred to herein as real-time messaging (RIM). RTM may include, for example, any messaging modality that may be used in an interactive two-way conversational mode between a plurality of communicating parties. RTM may also be used to send messages to a message store (i.e., a voice mailbox or integrated messaging mailbox), but it is distinguished from electronic mail (i.e., e-mail) in that it is designed to support two-way conversation. In an embodiment, RTM may be supported by protocols wherein the communications session is established using SIP or H.323 and messaging is done via one or more of voice, video, text, whiteboard, multimedia data streams, or the like. Examples of RTM include Voice over Internet Protocol ("VOIP"), video conferencing, Instant Messaging ("IM"), traditional voice calls via plain old telephone service (POTS) network, voice calls via a wireless network, or the like.

FIG. **1** illustrates the overall architecture and the communications context of an embodiment of the instant invention.

In normal operation of the real-time messaging network, user terminal devices **113-118** participate in RTM communications via a RTM capable network **100** such as the Internet, a WAN (wide-area network), or the like. In another embodiment, the RTM capable network **100** may be a telephony network, e.g., POTS network or a wireless network, capable of carrying real-time voice communications between parties. As discussed in greater detail below, this alternative embodiment may be particularly useful for a telephony service provider to block unsolicited telephone calls, such as telemarketing calls, directed to its subscribers.

The terminal devices **113-118** typically connect to the network **100** via a service provider who typically operates one or more network nodes (e.g., **108-109**) through which RTM traffic flows. Similar to a telephone number, an RTM message is communicated using a RTM address to identify an intended RTM message recipient and, usually, a RTM address to identify the actual sender. A terminal device is configured for communications using at least one RTM address to identify the terminal device to network. Like a telephone number, a RTM network user may have more than one RTM address. It should be noted that the terminal devices may be any component capable of originating and/or receiving RTM communications. In particular, the terminal devices may be, for example, a physical device such as a cell phone, a telephony handset, a computer-based communications device, or the like. The terminal device may also be a computer program executing on an electronic device.

Terminal devices (e.g., **113-118**) are coupled to a respective network site (e.g., **108**, **109**) via one or more of wireless and wired connections. In the case of a terminal device comprising a wire-coupled telephony handset or a personal computer, the terminal device may always connect through the same network nodes. For the case of a wireless-coupled terminal device, the network nodes through which that terminal device's RTM traffic passes may change as the terminal device's user moves the device.

Coupled to network **100** are terminal devices **110-112** that utilize RTM to originate unsolicited real-time, two-way communications. Devices **110-112** are typically connected to network **100** in a similar manner as user terminal devices **113-118**. In this case the network nodes that the terminal devices **110-112** connect through are not explicitly shown in the diagram, but are included as part of the communications network **100** itself.

In accordance with a system aspect of the present invention, FIG. **1** shows a representative plurality of sensor nodes **104-106** connected to the communications network **100**, such as in the same manner as the user terminal devices **113-118** and the RTM originating terminal devices **110-112**. Sensor nodes **104-106** are also coupled to a collection, processing and rule distribution (CPRD) node **101**. CPRD node **101** in turn is coupled for communications with a representative plurality of control agents **102-103**. Control agents **102-103** are illustrated as residing in network nodes **108-109** through which RTM traffic must flow to reach protected user terminal devices **113-118**. However, persons of ordinary skill in the art will appreciate that control agents **102-103** may reside elsewhere, such as between network nodes **108-109** and terminal devices **113-118**, or alternately within terminal devices **113-118** themselves.

Though CPRD **101** is illustrated as communicating with sensor nodes **104-106**, and control agents **102-103** outside communications network **100**, some or all of such communications may be within such network **100**.

In an embodiment, sensor nodes **104-106** may comprise computer programs running on a computer (or other electronic devices) or network of computers (all not shown) that accepts connections for one or more RTM addresses that do not actually correspond to an actual user of a RTM network such as network **100**. Because the RTM address does not correspond to an actual user, all communications received at that address are by definition unsolicited. A sensor node **104-106**, however, may run on the same computer or be part of the same computer program that also accepts RTM message traffic for actual users or reside on a CPRD node **101**. The sensor nodes collect information on RTM message traffic and communicate information about these RTM messages to the CPRD node **101**, for example, over the same communications network **100**.

Sensor nodes **104-106** are preferably distributed throughout the communications network **100** to ensure that as many delivery paths as possible of RTM communications are represented and that a large number of representative RTM communication sessions can be examined. Sensor nodes **104-106** collect information on this received RTM traffic to aid in identification of the source and nature of the RTM communications.

It is expected that many unsolicited RTM messages will exist whose source will be various terminal devices **110-112** dedicated to the sending, both via manual and automatic methods, of unsolicited RTM messages. It is also expected that many of the unsolicited RTM messages will be sent from the computers of actual users that have been taken over via a virus or other attack and are then used to send unsolicited RTM messages until they are discovered and repaired. It is further expected that the source of the unsolicited RTM messages will change rapidly.

When RTM messages are collected by the sensor nodes **104-106**, the RTM messages or characteristics determined from the RTM messages are forwarded to the CPRD node **101** for processing and analysis.

As illustrated in FIG. **2**, if the RTM message is determined by the CPRD node **101** to be an unsolicited RTM, the characteristics of this RTM message, such as its header, content, and any other identifying information will be used to develop filter rules **201-202** which may then be used to identify and control an RTM message received for a terminal device **113-118** of a real user.

Because RTM traffic is typically two-way interactive communications, it is preferred that the sensor nodes **104-106**, acting as decoys for unsolicited RTM traffic, employ various strategies to emulate the behavior that would be observed if the RTM address was in fact the address of an actual user. This includes displaying a network 'presence' (e.g., indicating that the 'user' is on-line and ready to interact) and, possibly, playing a recorded message to emulate a user interaction such as saying, "Hello" and/or offering access to an RTM account.

CPRD node (of which there can be several and which, for optimizing effectiveness, may share message and filter rule store data) comprises one or more computers running one or more programs. In a preferred embodiment, the CPRD node collects information from the sensor nodes that is relevant to identifying RTM messages. The CPRD node may then store and analyze the RTM message information to derive rules that can reliably distinguish the RTM messages observed at a sensor node from legitimate RTM traffic received by terminal devices employed by actual users.

For example, CPRD node **101** examines the RTM message characteristics such as the header of the message which can contain information on the sender such as their network IP address, media type, routing information and other identifying characteristics. In an embodiment in which the RTM message comprises voice communications, for example, the message characteristics may include caller identifier and/or source location information. Generally, the header information helps determine the source of the RTM message.

If one or more unsolicited RTM messages originate from the same originating address (e.g., the same IP address, caller identifier, etc.), then that originating address can be determined to be a unsolicited RTM source. The more messages are traced to that originating address, the more credible is the determination that the source is originating unsolicited RTM messages. However, because some unsolicited RTM messages are often sent from computers that have been compromised for the purpose of sending spam, it is preferable not to make the unsolicited RTM source judgment permanent, but rather to have it expire over a period of time (e.g., minutes, hours or days) if no further unsolicited RTM traffic is observed.

As illustrated in FIG. **2**, if the RTM message is determined by the processing center **101** to be an unsolicited RTM message, the characteristics of this message, such as its header, content, and any other identifying information will form or determine the core of the filter rules **201-202** that are distributed to the control agents **102-103**. Filter rules **201-202** comprise information useful to successfully block a particular unsolicited RTM message from reaching its destination.

The filter rules **201-202** are stored at the CPRD node **101** and tested to ensure that they are specific to the observed RTM traffic and that they do not trigger on legitimate RTM traffic. Filter rules **201-202** can be generated automatically, and can also be generated and validated via human input. Preferably, filter rules **201-202** are aged by CPRD node **101** and discarded after a period (e.g., days, weeks or months) as mass messaging campaigns end.

CPRD node **101** may also distribute rule information **201-202** to control agents **102-103** that filter RTM traffic in various ways if the traffic is sufficiently similar to RTM traffic that was observed at one or more of sensor nodes **104-106**. Filter rule data is maintained at CPRD node **101** and may be distributed to the control agents **102-103** incrementally as new rules are generated, or all at once if a node's **101** or agent's **102-103** rule store is reset or a new control agent is brought on-line.

Control agents **102-103** identify unsolicited RTM messages and control it for respective users of terminal devices **113-118**. For example, control agents **102-103** may separate incoming RTM traffic into messages that are to be received without modification or labeling (i.e., legitimate RTM messages) and those that are to be controlled further such as by rejecting, suppressing, diverting, or simply labeling according to the nature of their contents.

As demonstrated in FIG. **3**, a control agent **307** applies filter rules **305** to incoming RTM messages **300** (e.g., VOIP message). This processing occurs before the message is delivered to the destination terminal device **306**. For those RTM messages **300** determined to be unsolicited, control agent **307** applies a specific disposition **301-304** to the message, rejecting the message **304**, suppressing it by recording it and saving it in a quarantine store **302**, redirecting the message to an alternate location **303**, or flagging the RTM message **301** in such a way as to label it as unsolicited when it is delivered to the terminal device **306**. Disposition of a particular RTM message **300** may vary depending on the type or content of the RTM message.

Dispositions may be determined by control agent **307** based on a 'degree of certainty' metric contained in a filter rule **305**, depending on the configuration of the control agent **307**. The user of a terminal device **306** may examine RTM messages **300** disposed to the quarantine store **302** and return any erroneously classified messages to the CPRD node.

A protected terminal device **306** will receive an unsolicited RTM message if the control agent **307** is configured to label or flag the message as unsolicited, rather than reject or divert the message to alternate locations. The flagged message **301** can then be dealt with by the terminal device as per its configuration. Though not shown, messages which do not instigate disposition as unsolicited messages in accordance with the filter rules are delivered to terminal device **306**.

With reference to FIG. **4**, there is illustrated a method of controlling delivery of unsolicited RTM messages according to an embodiment of the present invention. At step **401**, a plurality of unsolicited RTM sensor node addresses are created for receiving unsolicited RTM traffic. At step **402**, the RTM spam sensor node addresses are distributed to one or more sensor nodes in a communications network for communicating RTM messages.

At step **403**, one or more of the sensor nodes receives RTM messages and forwards the messages to a CPRD node. At step **404** the CPRD node, extracts data from the RTM message to identify its content and source. At step **405**, a filtering rule set is created based on the source and content information of the spam RTM message, and at step **406**, the filtering rule set is forwarded to control agents installed at one or more terminal device connection sites. At step **407**, the control agents filter incoming RTM messages with the filtering rules to identify unsolicited RTM messages, and at step **408**, the control agent acts upon the unsolicited RTM messages. Acting upon the message may involve rejecting it, quarantining it, labeling and sending it on to the client terminal device, or the like. At step **409**, the filtered message may be further processed. For example, if it is sent to the terminal device, it may be processed by reviewing the message. If the message is quarantined, a user of the terminal device may direct it for further processing by a control agent (not shown).

As noted above, an embodiment of the present invention may be used by a telephony service provider (or other owner of a block of telephone numbers or URLs) to block unsolicited voice calls directed to its subscribers. For example, this embodiment may be useful to block telemarketers that use computerized dialing systems to automatically dial numbers within a specified address range. In this embodiment, the telephony service provider may allocate one or more system identifiers (numbers or URLs) for the purpose of identifying callers making unsolicited voice calls. The system identifiers may be, for example, a block of telephone numbers, URLs, a combination thereof, or the like.

This embodiment would be most useful in a situation where in bound calls could originate on a network like the Internet where the incoming message is much less likely to be traceable to a particular real world person or corporation.

The sensor nodes may be network nodes configured to respond to a call placed to one or more of the system call identifiers that do not correspond to actual customers, but may also be configured to respond to call identifiers corresponding to actual customers. Upon receipt of a call placed to a system call identifier, the sensor node may extract caller identification information, which may then be forwarded to the CPRD processing node. The CPRD processing node may generate filter rules and forward the filter rules to the control agents. The control agents may be a hardware and/or software component that is preferably located in the central office.

In operation, the control agents may compare calls directed to a customer with the filter rules. If a call matches one or more of the filter rules, the call may be directed to a predetermined recording or may simply be disconnected. It is preferred that the aging rules discussed above also be applied to voice calls.

Although the above description relates to specific embodiments as presently contemplated by the inventors, it is understood that the invention in its broad aspect includes mechanical and functional equivalents of the elements described herein.

What is claimed is:

1. A method for controlling unsolicited RTM calls, the method comprising:

assigning a system identifier to a sensor node in an RTM network, wherein the system identifier assigned to the sensor node does not correspond to an actual user of the RTM network;

receiving a first call to the system identifier of the sensor node;

retrieving caller identification information from the first call; and

creating one or more filter rules based upon the caller identification information, the one or more filter rules indicating that the caller identification information is a source of unsolicited RTM calls.

2. The method of claim **1**, further comprising:

receiving a second call;

determining if the second call matches one or more of the filter rules;

upon determining that the second call matches one or more of the filter rules, acting upon the second call; and

upon determining that the second call does not match one or more of the filter rules, allowing the second call.

3. The method of claim **2**, wherein the first and second call comprises a Voice Over Internet Protocol call.

4. The method of claim **1**, wherein the call identifiers correspond to IP addresses.

5. The method of claim **1**, wherein the caller identification information includes a calling telephone number or other call identifier.

6. A system for controlling unsolicited messaging in a real-time (RTM) network comprising at least one receiving terminal device adapted to receive RTM messages, said system comprising:

a sensor node coupled to the RTM network adapted to receive RTM messages from said one or more sending terminal devices, wherein the sensor node does not correspond to an actual user of the RTM network;

a monitoring and analysis facility coupled to the sensor node, said monitoring and analysis facility adapted to:

collect RTM message characteristics determined from unsolicited RTM messages received by said sensor node; and

construct filtering rules to identify and control unsolicited RTM messages, said filtering rules identifying sources of unsolicited RTM messages received at the sensor node.

7. The system according to claim **6**, wherein the RTM message comprises a voice call.

8. The system according to claim **6**, wherein the RTM messages include at least one of Voice Over Internet Protocol (VoIP) messaging; Instant Messaging (IM), voice communications via a POTS or wireless network, or video conferencing.

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